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ABSTRACT

The preparation of Drexel University faculty for the introduction of a microcomputing program is described. Faculty training had to be done on a variety of levels, from basic training in computer operation for the novice to advanced training in highly technical procedures and languages. Maximum faculty participation was sought throughout the planning, training, and implementation stages of the program. Faculty input included specification of university hardware and software needs, identification of vendors, relay of information between program staff and college divisions, and development of faculty training programs. Contents of the faculty introductory course and the topics of additional seminars are identified. Additional information on the introductory seminars, special programs, demonstrations, and a speakers series is provided. Technical assistance and other special resources available on campus are discussed with attention to release time for faculty projects, electronic searches to help faculty locate information, assistance in software design, programming support, services of the university's Software Review Center, exchange of ideas concerning software development efforts, and policy development concerning royalty payments for university-sponsored projects. (SW)

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THE MICROCOMPUTING PROGRAM AT DREXEL UNIVERSITY

PREPARING THE FACULTY

FACULTY DEVELOPMENT FOR THE MICROCOMPUTING PROGRAM

In the Fall of 1982, Drexel University decided to introduce a dramatic, new educational program for the 1983-84 academic year. The new program, which is presently underway, requires every freshman to have access to a personal computer for use in courses ranging from the sciences to the humanities.

The goal of this comprehensive program is to provide every Drexel student with the resources and training necessary to meet the challenges of the future — a future in which effective use of computers will be essential in virtually every field.

While Drexel certainly does not intend to make all its graduates computer scientists, it does seek to create an environment in which students learn about computers and become comfortable working with them as part of their regular coursework. The kind and degree of computer proficiency required will depend upon the student's academic concentration. Some will need to gain competency in one or more programming languages and environments; others will need to master a variety of applications packages. In all cases, however, the emphasis will be on using the computer as a powerful tool for exploring concepts and doing work.

THE ROLE OF THE FACULTY

The decision to introduce microcomputers into the Drexel curriculum was made with the understanding that faculty attitudes and skills would be crucial to the success of the program. Faculty would have to be familiar with the use of the microcomputer chosen and willing to introduce work on the computer as a normal part of their teaching. They would also have to devise applications for computers which would be a creative, not just perfunctory, addition to instruction in their fields. In order to prepare the faculty, the University embarked upon a massive faculty development effort helped by a $2.8 million grant from the Pew Memorial Trust.

At the time of the microcomputer decision, Drexel had a teaching staff whose computer knowledge and skills varied greatly. Some faculty knew little or nothing about computers and had no idea how the computer could be used in the classroom. Others were seasoned computer users who had long relied on computers for research and teaching. Most lay somewhere in between: they had used computers for specialized tasks or were familiar with one particular model. Thus faculty training had to be done on a variety of levels, from basic training in computer operation for the novice to advanced training in highly technical procedures and languages for those ready to use advanced techniques.

Enabling a large faculty (350 full-time and over 200 part-time) to use computers across the curriculum posed some obvious problems. The training format had to be flexible enough to fit a wide variety of skill levels and individual teaching and research schedules. It was necessary as well to consider the psychological by-products of a program of this kind. "Computer anxiety" was

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bound to be especially acute among novice users who were expected not only to learn about computers but also to use and teach what they themselves had just learned. There was also the physical reality of a temporarily increased workload and the prospect of faculty "burn out." Wherever possible, support had to be provided in the form of release time, travel funds, and technical and research assistance.

Finally, the faculty had to be encouraged to participate wholeheartedly in the program. For the microcomputer project to succeed, it had to have the full backing and cooperation of all faculty members. More than that, it required their creative input — ideas for software and for new computer applications in the classroom.

The faculty development effort as it has evolved at Drexel is an attempt to meet these needs. It consists of both short-term and on-going services and learning opportunities designed to ease the transition to university-wide acceptance and creative use of the personal computer.

FACULTY INPUT. Faculty acceptance of the microcomputer decision was, of course, crucial to the program's success. But since the actual decision to adopt the use of microcomputers across the curriculum was made by the administration, faculty acceptance and support had to be gained *after* the fact. For this reason, maximum faculty participation was sought throughout the planning, training, and implementation stages of the program.

Faculty input took many forms. Specification of university hardware and software needs and identification of vendors that could deliver a suitable product were left entirely in the hands of a faculty committee. (See *Choosing the Machine* for details on the formation of the Selection Committee and its operation.) In fact, administrative officers of the University did not become involved in the selection process until they were needed to begin negotiations with those vendors which the Selection Committee had identified. Even at the negotiation stage, faculty members were consulted to make sure the final contract met the specifications set up by the faculty committee.

While the selection process was underway, a faculty User's Committee was organized. This committee, which is still an on-going function, is made up of 15 experienced computer users from each of the six colleges. The group serves as an advisory body to the program's administrative staff and helps to relay information between the program staff and the individual colleges.

At various stages in the program's development, other faculty committees were established to meet specific needs. For example, each college now sets up its own Proposal Evaluation Committee at the beginning of each term. The committee reviews the proposals of individual faculty members for release time, support staff, and other forms of assistance. It then makes recommendations to the program administration. In this way, each college can make clear its own priorities for software or curriculum development. Committee members also evaluate the content and methodology of the proposals from their peers. (Recommendations of the college committees are honored except when technical considerations would interfere with successful completion of the proposed projects.)

Individual faculty members also perform key roles in the program. In one case, partial administrative leave was given to a tenured chemistry professor to serve as the program's Faculty Development Coordinator. In another case, a tenured member of the Psychology and Sociology Department was given load reduction in order to edit a weekly newsletter for faculty which features general information on microcomputers and specific faculty activities, learning opportunities and resources, and administration announcements relating to the program. (The bulk of each issue of this weekly is comprised of pieces contributed by the faculty.)

Finally, faculty training programs in microcomputer use were originally designed by faculty members, and training sessions continue to be taught primarily by faculty on a voluntary basis. This process of exchange in which professors assist their colleagues has helped to create a sense of purpose and good will within the Drexel community. It has also brought together members of departments who do not usually have contact with each other and has served to dispel some of the uncertainty and anxiety with which many of the faculty initially viewed the program.

SEMINARS AND WORKSHOPS

When Drexel first announced its decision to implement a microcomputer program, a number of faculty had already been using computers in their research and teaching for many years. These faculty members formed the foundation of the faculty development program. They led the first workshops and seminars and contributed to initial decisions concerning hardware and software.

In the months that followed, this core group expanded rapidly as more and more faculty mastered the basics of computer operation and programming and began to move into more advanced areas. Today, every department in the university, from the sciences to the humanities, has its own core of experts who are actively engaged in training their colleagues. As a result, training is now more specifically tailored to individual disciplines and needs.

FACULTY TRAINING

INTRODUCTORY COURSE

- Introduction to the microcomputer
- Elementary programming in BASIC
- Word processing
- Spreadsheet
- Database management
- Educational software

ADDITIONAL SEMINARS

- Computer Algebra
  - TK! Solver
  - MuMath
- Reading and Writing Pascal
- Beyond Proofing and Editing
- What Computers Do
- Searching a Bibliographic Database
- Object-Oriented Programming
- Tool Kit 32: An Object-Oriented Environment for the Lisa
- Statistical Analysis Using a Microcomputer
- Workshop on Developing Instruction Software - Alfred Bork

THE INTRODUCTORY SEMINAR SERIES. In January, 1983, when the microcomputer program was still in its early planning stages, Drexel offered the first of what would be many introductory seminars on the use of microcomputers in an academic environment. These seminars were open to all full-time faculty and consisted of a 20-hour hands-on introduction to the operation and programming of a personal computer. They also provided instruction in four basic applications: wordprocessing, spreadsheet, database management, and educational software. The seminars were offered at regular intervals throughout the year so that almost one-third of the 350-member faculty had participated by Fall term of 1983.

In September, 1983, the first seminar series was given a more flexible format. Although the same content was covered in the series, each session was offered as a self-contained unit devoted to a single topic. Faculty could now shop for a session which interested them, fill a gap in their existing knowledge, or (very often) acquire information and skills to meet an immediate research or pedagogical need. In other words, they could attend a particular seminar without having to commit themselves to a full course sequence.

Since, at the outset, so few faculty had had much experience with microcomputers and their applications, the total-immersion format of the original series was probably needed to "prime the pump" at the beginning of the program. This 20-hour commitment was facilitated by a one-course equivalent of release time granted to selected faculty for their participation during Winter and Spring terms of 1983. Beginning Summer of 1983, however, no release time was provided. This didn't seem to discourage participation, perhaps because so many faculty had been trained in the Winter and Spring that others were eager to "catch up." Moreover, the arrival of the computers was imminent, and faculty now experienced a genuine "need to know."

SPECIAL PROGRAMS. During Summer Term of 1983, 45 members of the College of Business and Administration (CB&A) participated in a seven-week seminar specifically designed to help them use computers in their teaching. This seminar was conceived of and taught by a senior faculty member in that College. During each session, participants experimented with a variety of software packages and were directed to complete assignments using what they had learned. As a final assignment, each was asked to prepare a computer-based lecture related to his or her field of expertise. The lectures were then presented to colleagues as practical.

The computer-based lectures sparked interest in the CB&A faculty as a whole and created a demand for more seminars. As a result, three additional seminars were offered to full-time faculty and to teaching and research assistants in that College. Computer-based lectures which resulted from these seminars addressed subject matter in the fields of finance, accounting, marketing, and economics.

DEMONSTRATIONS. Since January, 1983, the University has sponsored demonstrations of a variety of microcomputer models and software packages. The knowledge and skills gained from this exposure made it easier for faculty to adjust to the microcomputer when it arrived in January of 1984.

SPEAKERS SERIES. In 1983, Drexel began sponsoring a special lecture series on the practical, theoretical and moral issues related to education in a technological world. The series has helped to place the microcomputer program into a larger context of nationwide trends and concerns. Each speaker in the series delivers a formal presentation to the entire faculty and meets with smaller groups of faculty and students for informal discussion throughout the day. Speakers have included Stan Smith, Marvin Minsky, Seymour Papert, and Joseph Weisenbaum. (Transcripts of many of the speeches presented are included in the Computer Speakers Series portion of these papers.)

INTERNAL COMMUNICATION

From the beginning, administrators of the microcomputer program recognized the need to establish a dialogue with faculty and students. Not only did information about the program need to be disseminated on an ongoing basis, but also opinions, ideas, and questions from the Drexel community needed to be given a forum. For this purpose, two internal publications were established: *Boot* and *Drexel Micro News*.

Boot is a weekly newsletter, produced by and addressed to faculty. It contains opinion pieces, teaching and design ideas, and announcements of meetings, courseware developments, grant opportunities, and other information relevant to faculty involvement in the microcomputer program.

Drexel Micro News is a monthly newsletter, addressed specifically to students but also sent to faculty, which answers practical questions about acquisition of equipment, availability of services, operation of the micros, and similar types of how-to information.

SOFTWARE SELECTION AND PREPARATION

Successful integration of the personal computer into the undergraduate curriculum requires quality software. Therefore, Drexel offers support for its faculty in selecting and developing instructional software and in exploring computer applications in the classroom. This support takes the form of release time, travel expenses for attendance at conferences and seminars throughout the country, funds for graduate and undergraduate assistants, and assistance from technical staff and other special resources. The technical assistance and other special resources available on campus are discussed below.

RELEASE TIME. Recognizing that the integration of microcomputers into the University curriculum would require a great deal of time and work on the part of the faculty, release time has been made available for specific faculty projects approved by the College User's Committee.

Initially, some faculty members were granted release time to attend the introductory computer seminars. This policy was discontinued by the Summer of 1983 when almost 100 of the faculty had attended these sessions. Subsequently, release time has been awarded, on a quarterly basis, for development of specific software, for identification of software appropriate to different course formats, and for development projects likely to have value for the Drexel microcomputer program. During Fall term, 1983, about 10% of the faculty were given a load reduction (usually 25%) for this purpose. Similar figures were reported for Winter, 1984.

LOCATING INFORMATION. As part of their general services, the Reference Department of the University library will perform manual and electronic searches to help faculty who wish to locate information about existing software, software applications, and software development. A guide for faculty members who want to use library resources to investigate software on their own, along with a listing of other resources on campus and nationwide, has been prepared by the library staff. The Instructional Software Coordinator is also available to assist faculty in locating sources of software information.

SOFTWARE DESIGN. Assistance in software design is provided by both the Instructional Support Group and the Instructional Courseware Coordinator. The Instructional Support Group, which also provides programming support, offers technical help in evaluating the capabilities of existing software and the types of software which are compatible with different kinds of equipment. The Instructional Courseware Coordinator helps with the instructional aspects of software design. Both of these resources encourage faculty to familiarize themselves with existing software and to exploit the capabilities of the hardware and software with which they work. Faculty are also directed to existing software packages which address problems similar to their own.

PROGRAMMING. Although some faculty members prefer to do their own programming, they are generally encouraged to apply for graduate or undergraduate assistants or to use the programmers within the Instructional Support Group to do this work for them. This programming support enables them to devote their own time to research, design, and testing of the software they are developing. Faculty may submit proposals for more extensive programming support on a quarterly basis.

SOFTWARE REVIEW CENTER. Crucial to the success of the microcomputer program at Drexel is the Software Review Center, located within the University library. The Center serves a reference function, collecting and classifying existing software along with related manuals, periodicals, and books. Faculty come here to explore new software packages for use in their teaching and to research the latest programming and application packages as the basis for developing their own materials. An Apple IIe, an IBM Personal Computer, and several Apple Lisas are available on site for their use, and there are plans for the addition of more machines in the near future. The Center has its own collection of serials and functions on an independent acquisitions budget.

DEVELOPER'S SESSIONS. Beginning in the Fall term of 1983, a group of Drexel chemistry professors began to meet to exchange ideas concerning their software development efforts. Peer review led to refinements in the individual projects. By observing and discussing the work of others, they also began to discover new techniques and applications which they could apply to their own work.

The success of this small project led to a University-wide series of developers' sessions. Participants in these sessions now meet in the Software Review Center once a week at lunchtime. Each week, one or more works-in-progress are presented for comment by the group, and presentations are organized around a particular development problem or application. Sessions are open to all interested faculty members, and a schedule of weekly topics is announced in *Boot*. All faculty receiving release time or other forms of University support related to the microcomputer program are particularly encouraged to attend.

COPYRIGHT CONSIDERATION. While markets for educational software are growing rapidly, the laws governing these materials have not yet been formally codified. To avoid potential problems in this area, Drexel is developing its own policy concerning royalty payments for University-sponsored projects.

Under the proposed policy (currently under review by Drexel's administration and Board of Trustees), royalties would be split so that one portion would go to the University's general fund, another portion would be funneled back into other software development projects, and the remainder would be paid to the developer. Both the University and the faculty would stand to profit by this distribution.

CONCLUSION

The Drexel faculty have been vital to the success of the microcomputer program. In the first phase of the program, they helped evaluate hardware and identify the vendors with which the University would carry on negotiations. Their contribution continued as they became the teachers of their colleagues — developing and leading the first workshops and seminars on microcomputer use, then devising new training formats and special programs as more faculty mastered the rudimentary skills. Finally, they have continued to enrich the program with new ideas for software and for teaching applications tailored to their individual disciplines.

Recognizing the importance of faculty input, the Drexel administration has tried to create an atmosphere in which faculty participation is encouraged. As a result, the University now provides extensive support in the form of release time, travel funds, and technical and research assistance. To assure that support is fairly distributed, a system of peer review has been set up so that faculty requests can be evaluated in the context of college and university needs. In addition, resources have been developed within the University which provide access to research materials and assistance in software design and programming. This support has reduced "computer anxiety" and helped foster a spirit of cooperation, enthusiasm, and creativity.

The Drexel faculty have come to view the microcomputer as a positive addition to the curriculum, one which enhances their teaching and facilitates their own research. Faculty in fields ranging from the sciences to the humanities now contribute ideas to Drexel's microcomputer newsletter, *Boot*, and regularly attend the program's Computer Speakers Series. Each term, more faculty members experiment with software, design their own programs, and develop new applications for microcomputers in the classroom.

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